Retrospective evaluation of interval breast cancer with AI diagnostic software

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From insight to impact.

Conflict of Interest Statement

- A Gräwingholt has had medical advisory roles with iCAD Inc.
- All authors have no other relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the presentation apart from those disclosed.

Can the number of interval carcinomas be reduced utilizing AI diagnostic software?

Patient population

"donna" Mammography Screening Program:
- Public offering for women from 50 to 69 years in St.Gallen & Grisons (CH)
- Bi-annual invitations with ~18,500 mammograms p.a. (~50% participation rate)
- Program has been established in 2010, data available for analysis until 2019

Interval cancer: Invasive and in-situ breast cancer (ICD10: C50 and D05) of women who got screened in the program with mammograms interpreted as normal, but got diagnosed with breast cancer up to 24 months after the screening

Data sources: Data from the "donna" screening program and the Cancer Registries of Eastern Switzerland and Grisons-Glarus have been matched

251 interval breast cancers (IBC)

883 screen-detected breast cancers (SBC)

AI provides two key metrics per woman screened based on 2D FFMD

ProFound AI (iCAD Inc.)

Case score (status quo assessment)
- **Value:** Numeric from 0 to 100
- **Explanation:** Reflects the degree of confidence that the case contains a cancer compared to the training database
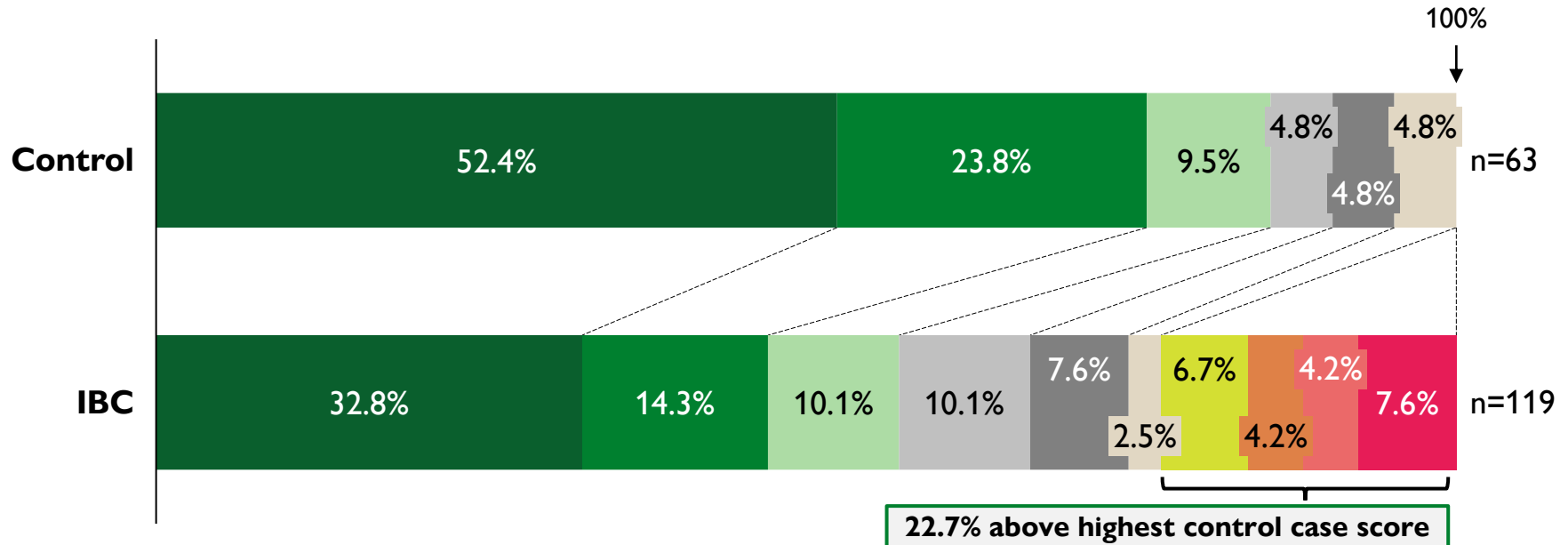
Risk classification (prognostic forecast)
- **Value:** Categorical (low; general; moderate; high) & numeric
- **Explanation:** Reflects the risk of being detected with breast cancer within the next two years after a normal mammogram based on age, regional incidence data and numerous mammographic features
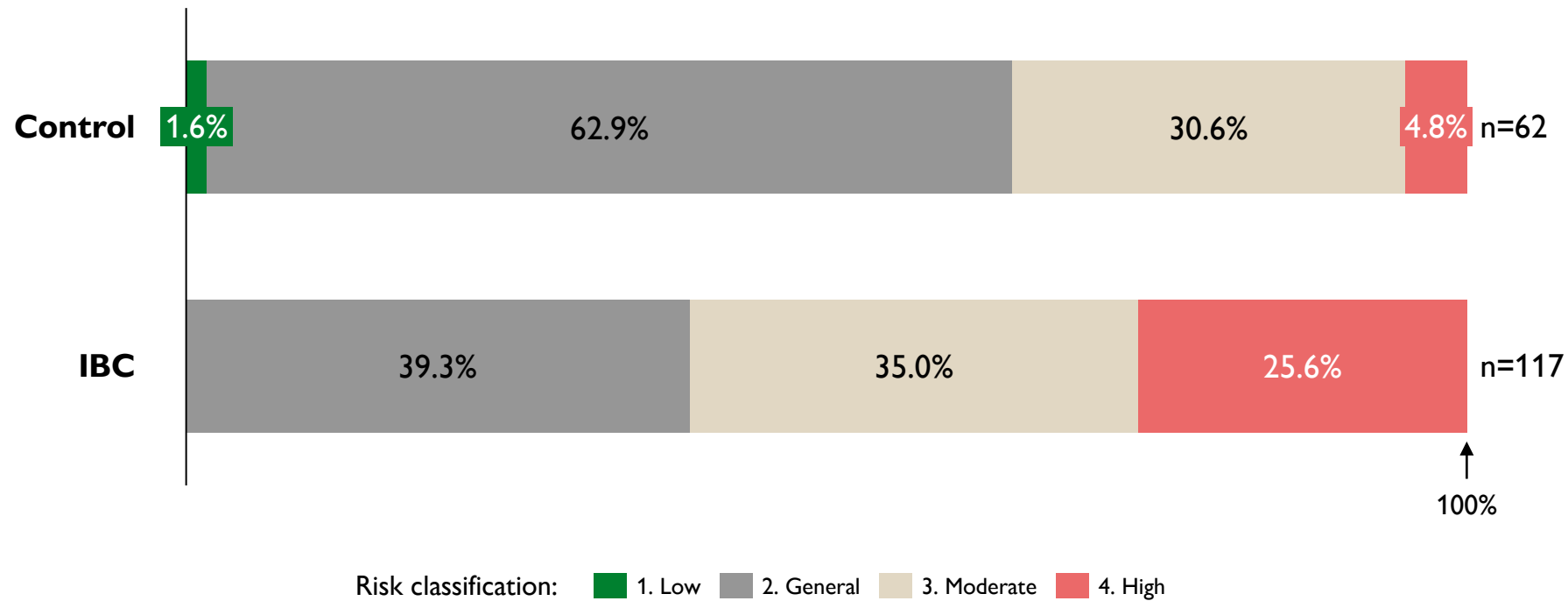
Normal screening mammograms which later have been detected with interval cancer (IBC) had much higher risk classifications

Control | 1.6% | 62.9% | 30.6% | 4.8% n=62

IBC | 39.3% | 35.0% | 25.6% | n=117

100%

Risk classification: ■ 1. Low ■ 2. General ■ 3. Moderate ■ 4. High

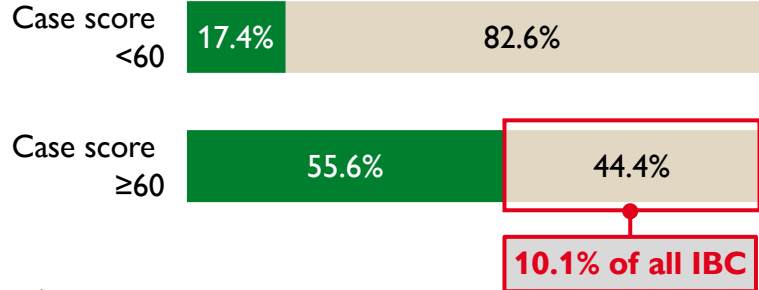Universität St.Gallen
School of Medicine

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Consensus conferences | 10.1% of all IBC received high case score but have not been in consensus conference during regular screening

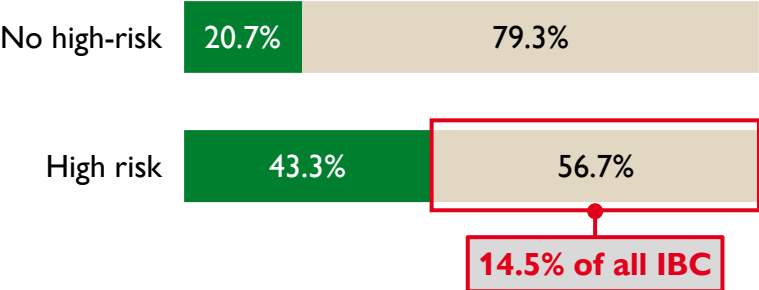## Consensus conferences

Yes   No

Overall share in consensus conference: 9.7% | 90.3%

IBC in consensus conference: 26.1% | 73.9%

Case score

Case score <60: 17.4% | 82.6%

Case score ≥60: 55.6% | 44.4%

10.1% of all IBC

Risk classification

No high-risk: 20.7% | 79.3%

High risk: 43.3% | 56.7%

14.5% of all IBC

Conclusion

? Can the number of interval carcinomas be reduced utilizing AI diagnostic software?

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Case score

- 22.7% of all IBC with a score ≥ 60

- **10.1%** of all IBC got a high score and haven't been in consensus conference

Risk classification

- 25.6% of all IBC with high-risk classification

- **14.5%** of all IBC got a high-risk and haven't been in consensus conference

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! These findings indicate a relevant potential of AI to bring relevant cases into the consensus conference

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Analyze larger dataset (incl. SBC):
a) Identify score that provides greatest sensitivity/ specificity
b) Evaluate the most valuable screening program set-up